

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-76 (CANCELLED)

77. (Currently Amended) A method for determining ~~the~~a location of a mobile terminal in a cellular communication network, the mobile terminal being configured to receive signals from satellites of a satellite-based positioning system, the method comprising:

receiving, at the mobile terminal, signals from a plurality of satellites;

measuring, at the mobile terminal, pseudoranges to the satellites at a time of signal reception;

calculating the location of the mobile terminal based on parameters representing the measured pseudoranges;

determining a quality measure associated with the location calculation;

comparing the determined quality measure to a first predefined quality criterion; and

recalculating, if the quality measure does not fulfill the first predefined quality criterion, the location of the mobile terminal with added correction for error in at least one parameter representing a parameter measured at the mobile terminal, wherein

said calculating step uses a parameter for the time of signal reception measured at the mobile terminal, and

said recalculating step involves correction for error in the parameter for the time of signal reception by using a transmission time offset parameter as an additional unknown parameter.

78. (Previously Presented) The method of claim 77, further comprising:
determining a quality measure associated with the location recalculation of said recalculating step;

comparing the determined quality measure of the recalculation with a second predefined quality criterion; and

performing, if the quality measure does not fulfill the second predefined quality criterion, a second recalculation of the location of the mobile terminal in an iterative calculation procedure for pseudorange outlier correction.

79. (Previously Presented) The method of claim 77, further comprising:
determining a quality measure associated with the location recalculation with a second predefined quality criterion; and

performing, if the quality measure does not fulfill the second predefined quality criterion, a second recalculation of the location of the mobile terminal with correction for error in the time of signal reception by using a transmission time offset parameter as an additional unknown parameter.

80. (Currently Amended) The method of claim 78, further comprising:
determining a quality measure associated with the second recalculation;
comparing the determined quality measure of the second recalculation
with a third predefined quality criterion; and

performing, if the quality measure does not fulfill the third predefined
quality criterion, a third recalculation of the location of the mobile terminal
with the correction using the transmission time offset parameter as ~~an~~a the
additional unknown parameter in combination with the correction for error
through the iterative calculation procedure for pseudorange outlier correction.

81. (Currently Amended) The method of claim 78, wherein said iterative
calculation procedure for pseudorange outlier correction involves location
computations using ~~a~~a the transmission time offset parameter as ~~an~~a the
additional unknown parameter for correction for error in the parameter
representing the time of signal reception.

82. (Currently Amended) The method of claim 77, wherein said
calculating step uses ~~a~~a the transmission time offset parameter as ~~an~~a the
additional unknown parameter and said recalculating step involves correction
for error in at least one representative of the pseudoranges measured at the

mobile terminal using the transmission time offset parameter in an iterative calculation procedure for pseudorange outlier correction.

83. (Currently Amended) The method of any of claim 78, wherein the iterative calculation procedure for pseudorange outlier correction ~~in turn~~ comprises:

computing the location of the mobile terminal repeatedly, omitting one pseudorange measurement at a time;

determining a quality measure associated with each computed location;

evaluating the determined quality measures, whereby a comparatively high quality is an indication that the omitted pseudorange is an outlier; and

removing, if an outlier pseudorange was detected in the evaluating step, the outlier pseudorange and using the location computed with the outlier pseudorange omitted as the mobile terminal location.

84. (Currently Amended) The method of claim 77, wherein the transmission time offset parameter represents ~~the~~ a time difference between the time of signal transmission from the respective satellites and the network time of the satellite-based positioning system.

85. (Previously Presented) The method of claim 77, wherein the quality measure is a measure of the parameter estimate quality determined using the residual of a least squares solution for the mobile terminal location.

86. (Currently Amended) The method of of claim 77, further comprising the step of reconstructing, in case at least one of the measured pseudoranges is a truncated pseudorange, a complete pseudorange from the truncated pseudorange based on ~~a parameter for the~~ time of signal reception at the mobile terminal and an approximate mobile terminal location.

87. (Currently Amended) The method of claim 77, wherein the respective steps of calculating and recalculating in turn comprises:

defining a nonlinear equation system with unknown parameters at least for the mobile terminal location and ~~the a~~ a mobile terminal clock bias;

linearizing the equation system such that the satellite motion is modeled as linear with a nominal satellite position and a velocity vector; and

solving the equation system for the mobile terminal location.

88. (Currently Amended) The method of claim 87, comprising:

determining the nominal position for the respective satellites using a time of satellite transmission determined based on ~~a the~~ the measured

pseudorange and ~~a parameter for the~~ time of signal reception at the mobile terminal; and

expressing the satellite position in a local tangential coordinate system with two horizontal and one vertical coordinate.

89. (Currently Amended) A mobile terminal in a cellular communication network, the mobile terminal ~~being provided with means for determining its location,~~ comprising:

means for receiving signals from a plurality of satellites of a satellite-based positioning system;

means for measuring pseudoranges to the satellites at a time of signal reception;

means for calculating ~~the~~ a location of the mobile terminal based on parameters representing the measured pseudoranges,

means for determining a quality measure associated with the location calculation;

means for comparing the determined quality measure to a first ~~predefined~~ predefined quality criterion; and

means for recalculating, if the quality measure does not fulfill the first predefined quality criterion, the location of the mobile terminal with added correction for error in at least one parameter representing a parameter measured at the mobile terminal, wherein

said means for calculating is adapted for using a parameter for the time of signal reception measured at the mobile terminal and said means for recalculating involves means for correction for error in the parameter for the time of signal reception through a transmission time offset parameter as an additional unknown parameter.

90. (Currently Amended) The mobile terminal of claim 89, further comprising:

means for determining a quality measure associated with the location recalculation; and

means for a second recalculation, if the quality measure does not fulfill ~~the a~~ second predefined quality criterion, of the location of the mobile terminal involving means for iterative pseudorange outlier correction.

91. (Canceled)

92. (Previously Presented) The mobile terminal of claim 90, further comprising:

means for determining a quality measure associated with the second recalculation;

means for comparing the determined quality measure of the second recalculation with a third predefined quality criterion; and

means for a third recalculation of the location of the mobile terminal, in case the quality measure does not fulfill the third predefined quality criterion, said third recalculation comprising the correction for error through the transmission time offset parameter in combination with the iterative pseudorange outlier correction.

93. (Currently Amended) The mobile terminal of claim 90, wherein said iterative pseudorange outlier correction involves means for location computations with ~~a~~the transmission time offset parameter as ~~an~~the additional unknown parameter.

94. (Currently Amended) The mobile terminal of claim 89, wherein said means for calculating is adapted for using ~~a~~the transmission time offset parameter as ~~an~~the additional unknown parameter and said means for recalculating involves means for correction for error in at least one representative of the pseudoranges measured at the mobile terminal using the transmission time offset parameter in iterative pseudorange outlier correction.

95. (Currently Amended) The mobile terminal of claim 90, comprising means for iterative calculation with pseudorange outlier correction comprising; means for repeatedly computing the location of the mobile terminal, omitting one pseudorange measurement at a time;

means for determining a quality measure for each computed location;

means for evaluating the determined quality measures, whereby a comparatively high quality is an indication that the omitted pseudorange is an outlier; and

means for removing, if an outlier pseudorange was detected by ~~the said~~ evaluating means, the outlier pseudorange, whereby the location computed with the outlier pseudorange omitted is used as the mobile terminal location.

96. (Previously Presented) The mobile terminal of claim 89, wherein the quality measure is based on the residual of a least squares solution for the mobile terminal location.

97. (Currently Amended) The mobile terminal of claim 89, further comprising means for reconstructing a complete pseudorange from a measured truncated pseudorange based ~~on a parameter for the~~ time of signal reception at the mobile terminal and an approximate mobile terminal location.

98. (Currently Amended) A positioning node in a cellular communication network with means for determining ~~the a~~ a location of a mobile terminal in the cellular communication network, the mobile terminal ~~being provided~~ arranged with means for receiving signals from satellites of a satellite-based positioning system, the node comprising:

means for receiving, from the mobile terminal, parameters relating to measured pseudoranges to a plurality of satellites, the pseudoranges relating to ~~the~~a time of measurement;

means for calculating the location of the mobile terminal based on parameters representing the measured pseudoranges;

means for determining a quality measure associated with the location calculation;

means for comparing the determined quality measure to a first predefined quality criterion; and

means for recalculating, if the quality measure does not fulfill the first predefined quality criterion, the location of the mobile terminal with added correction for error in at least one parameter representing a parameter measured at the mobile terminal, wherein

said means for calculating is adapted for using a parameter for the time of signal reception reported by the mobile terminal and said means for recalculating involves means for correction for error in the parameter for the time of signal reception through a transmission time offset parameter as an additional unknown parameter.

99. (Previously Presented) The positioning node of claim 98, further comprising;

means for determining a quality measure associated with the location recalculation;

means for comparing the determined quality measure of the recalculation with a second predefined quality criterion; and

means for a second recalculation, if the quality measure does not fulfill the second predefined quality criterion, of the location of the mobile terminal involving means for iterative pseudorange outlier correction .

100. (Canceled)

101. (Previously Presented) The positioning node of claim 99, further comprising:

means for determining a quality measure associated with the second recalculation;

means for comparing the determined quality measure of the second recalculation with a third predefined quality criterion; and

means for a third recalculation of the location of the mobile terminal, in case the quality measure does not fulfill the third predefined quality criterion, said third recalculation comprising the correction through the transmission time offset parameter in combination with the iterative pseudorange outlier correction.

102. (Currently Amended) The positioning node of claim 99, wherein said iterative pseudorange outlier correction involves means for location computation with ~~a~~the transmission time offset parameter as ~~an~~the additional unknown parameter.

103. (Currently Amended) The positioning node of claim 98, wherein said means for calculating is adapted for using ~~a~~the transmission time offset parameter and said means for recalculating involves means for correction for error in at least one representative of the pseudoranges measured at the mobile terminal using the transmission time offset parameter in iterative pseudorange outlier correction.

104. (Currently Amended) The positioning node of claim 99, comprising means for iterative calculation with pseudorange outlier correction that in turn includes:

means for repeatedly computing the location of the mobile terminal, omitting one pseudorange measurement at a time;

means for determining a quality measure for each computed location;

means for evaluating the determined quality measures, whereby a comparatively high quality is an indication that the omitted pseudorange is an outlier; and

means for removing, if an outlier pseudorange was detected by ~~the~~said evaluating means, the outlier pseudorange, whereby the location computed with the outlier pseudorange omitted is used as the mobile terminal location.

105. (Previously Presented) The position node of claim 99, wherein the quality measure is based on the residual of at least squares solution for the mobile terminal location.

106. (Currently Amended) The positioning node of claim 99, further comprising means for reconstructing a complete pseudorange from a measured truncated pseudorange based on ~~a parameter for~~ the time of signal reception at the mobile terminal and an approximate mobile terminal location.

107. (Currently Amended) A communication system with means for determining ~~the~~ a location of a mobile terminal in a cellular communication network, the mobile terminal ~~being provided~~ arranged with means for receiving signals from satellites of a satellite-based positioning system, the communication system comprising the positioning node of claim 98.

108. (New) A method for determining a location of a mobile terminal in a cellular communication network, comprising:

receiving, at the mobile terminal, signals from a plurality of satellites;

determining, at the mobile terminal, a signal reception time and a plurality of pseudoranges of the plurality of satellites;

performing a first location calculation, at the mobile terminal or at a position node of the cellular communication network, of calculating a first location of the mobile terminal based on the signal reception time and the plurality of pseudoranges;

determining, at the mobile terminal or at the position node, whether a quality of the first location is within a first quality threshold;

determining, at the mobile terminal or at the position node, the first location as the location the mobile terminal when it is determined that the first location is within the first quality threshold; and

performing, at the mobile terminal or at the position node, a second location calculation, a third location calculation, or both when it is determined that the first location is not within the first quality threshold,

wherein the second location calculation corrects for an error in the signal reception time determined at the mobile terminal and is based on a transmission offset parameter not used in the first location calculation, and

wherein the third location calculation corrects for error or errors in the plurality of pseudoranges determined at the mobile terminal.

109. (New) The method of claim 108, wherein at least one of the first, second, and third location calculations is performed at the mobile terminal.

110. (New) The method of claim 108, wherein the third location calculation comprises:

identifying, at the mobile terminal or at the position node, an outlier pseudorange of the plurality of pseudoranges, the outlier pseudorange being the pseudorange that make a highest contribution to an error in the first location calculated when the first location calculation is performed; and

performing the first location calculation, at the mobile terminal or at the position node, of calculating the first location of the mobile terminal based on the signal reception time and the plurality of pseudoranges minus the outlier pseudorange.

111. (New) The method of claim 108, wherein the third location calculation comprises:

identifying, at the mobile terminal or at the position node, an outlier pseudorange of the plurality of pseudoranges, the outlier pseudorange being the pseudorange that make a highest contribution to an error in the second location calculated when the second location calculation is performed; and

performing the second location calculation, at the mobile terminal or at the position node, to correct for the error in the signal reception time determined at the mobile terminal based on the signal reception time, the

plurality of pseudoranges minus the outlier pseudorange, and the transmission offset parameter.